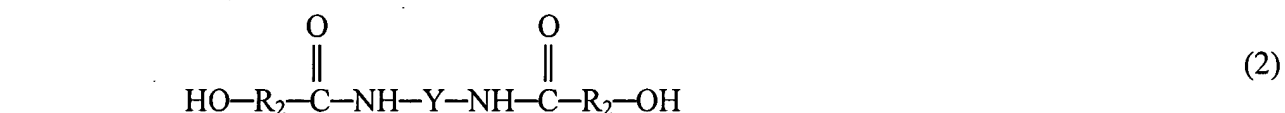
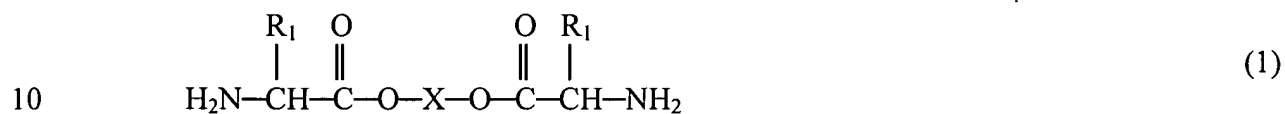


CLAIMS

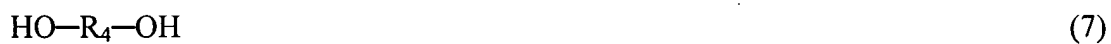
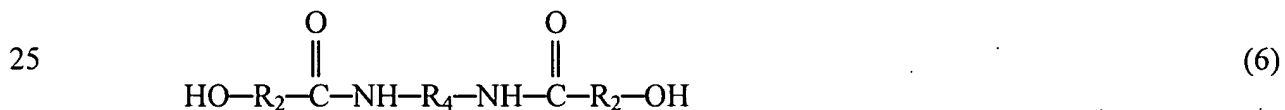
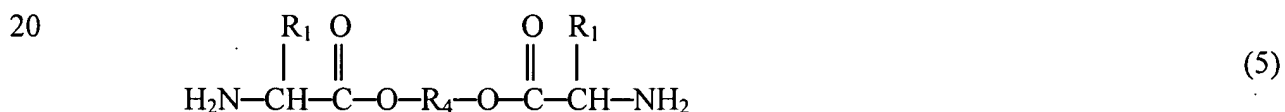
WHAT IS CLAIMED IS:

1. A medical article comprising an implantable substrate having a coating, the coating including a polymeric product of a reaction between a first reagent, a second reagent, and a third reagent, wherein:

(a) the first reagent is selected from a group consisting of compounds having formulae (1), (2), (3), and (4):



(b) the second reagent is selected from a group consisting of compounds having formulae (5), (6), (7), and (8):



(c) the third reagent is a dicarboxylic acid having the formula (9):



5

wherein:

R_1 is hydrogen, methyl, *iso*-propyl, *sec*-butyl, *iso*-butyl, or benzyl group;

R_2 is methylene, methylenemethylene, *n*-propylene, *iso*-propylene, ethylenemethylene, *n*-butylene, *iso*-butylene, *sec*-butylene, or *n*-amylene group;

10 R_3 is a straight chained or branched aliphatic alkylene group C_nH_{2n} , wherein n is an integer between 2 and 12;

R_4 is a moiety derived from a compound selected from a group consisting of poly(ethylene glycol), poly(propylene glycol), random poly(ethylene glycol-co-propylene glycol), poly(ethylene glycol)-block-poly(propylene glycol), hyaluronic acid, poly(2-
15 hydroxyethyl methacrylate), poly(3-hydroxypropylmethacrylamide), poly(styrene sulfonate), poly(vinyl pyrrolidone), and cellulose;

X is a straight chained or branched aliphatic alkylene group C_nH_{2n} , wherein n is an integer between 2 and 12; and

20 Y is a straight chained or branched aliphatic alkylene group C_nH_{2n} , wherein n is 1, 2, or 5.

2. The medical article of Claim 1, wherein the implantable substrate is a stent.

3. The medical article of Claim 1, wherein the compound of formula (1) is a diol-diamine, the diol-diamine is a product of condensation of an amino acid and a diol.

4. The medical article of Claim 3, wherein the amino acid has the formula (10):



5. The medical article of Claim 3, wherein the amino acid is selected from a group consisting of glycine, alanine, valine, isoleucine, leucine, and phenyl alanine.

6. The medical article of Claim 3, wherein a diol is selected from a group
 5 consisting of ethylene glycol, 1,3-propanediol, 1,4-butane diol, 1,5-pentanediol, 1,6-hexanediol, 1,7-heptanediol, 1,8-octanediol, 1,9-nonanediol, 1,10-decanediol, 1,11-undecanediol, and 1,12-dodecanediol.

7. The medical article of Claim 1, wherein the compound of formula (2) is an amidediol, the amidediol is a product of condensation of a hydroxy acid and a diamine.

10 8. The medical article of Claim 7, wherein the hydroxy acid has the formula (11):



9. The medical article of Claim 7, wherein the hydroxy acid is selected from a group consisting of glycolic acid, lactic acid, β -hydroxybutyric acid, α -hydroxyvaleric acid, and ϵ -hydroxycaproic acid.

15 10. The medical article of Claim 7, wherein the diamine is selected from a group consisting of putrescine, 1,2-ethanediamine, and cadavarene.

11. The medical article of Claim 1, wherein the compound of formula (3) is selected from a group consisting of ethylene glycol, 1,3-propanediol, 1,4-butane diol, 1,5-pentanediol, 1,6-hexanediol, 1,7-heptanediol, 1,8-octanediol, 1,9-nonanediol, 1,10-decanediol,
 20 1,11-undecanediol, and 1,12-dodecanediol.

12. The medical article of Claim 1, wherein the compound of formula (4) is selected from a group consisting of putrescine, 1,2-ethanediamine, and cadavarene.

13. The medical article of Claim 1, wherein the compound of formula (5) is a PEG-diester-diamine conjugate, the conjugate is a product of condensation of an amino acid
5 and poly(ethylene glycol).

14. The medical article of Claim 13, wherein the amino acid has the formula (10):



15. The medical article of Claim 13, wherein the amino acid is selected from a group consisting of glycine, alanine, valine, isoleucine, leucine, phenyl alanine, tyrosine,
10 serine, and glutamic acid.

16. The medical article of Claim 1, wherein the compound of formula (6) is a PEG-amidediol conjugate, the conjugate is a product of condensation of a hydroxy acid and PEG-diamine.

17. The medical article of Claim 16, wherein the hydroxy acid has the formula (11):



18. The medical article of Claim 17, wherein the hydroxy acid is selected from a group consisting of glycolic acid, lactic acid, β -hydroxybutyric acid, α -hydroxyvaleric acid, and ϵ -hydroxycaproic acid.

19. A medical article comprising an implantable substrate having a coating, the
20 coating including a copolymer having a general formula (12) or (13):



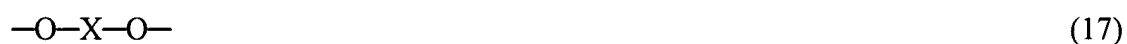
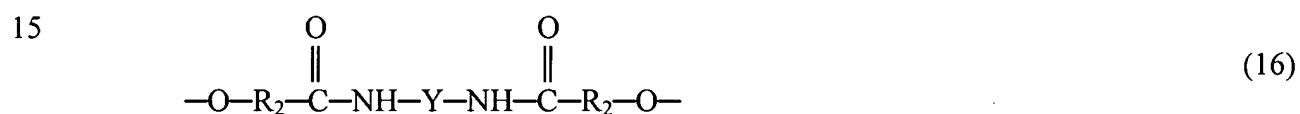
wherein:

M is a moiety represented by the structure having the formula (14)



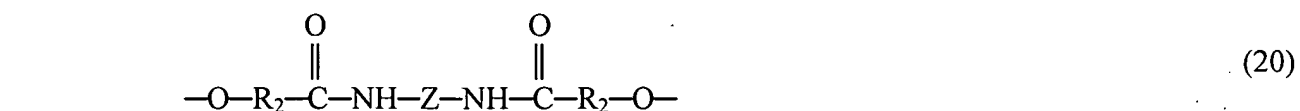
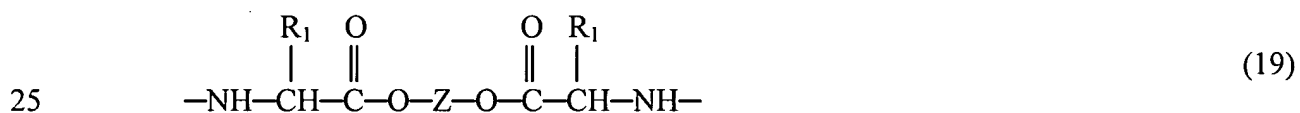
P is a moiety selected from a group consisting of structures having the formulae (15),

(16), (17), and (18):



Q is a moiety selected from a group consisting of structures having the formulae (19),

(20), and (21)



M_1 is a moiety represented by the structure having the formula (22):



5

R_1 is hydrogen, methyl, *iso*-propyl, *sec*-butyl; *iso*-butyl, or benzyl group;

R_2 is methylene, methylenemethylene, *n*-propylene, *iso*-propylene, ethylenemethylene, *n*-butylene, *iso*-butylene, *sec*-butylene, or *n*-amylene group;

R_3 is a straight chained or branched aliphatic alkylene group C_nH_{2n} , wherein n is an integer between 2 and 12;

10

X is a straight chained or branched aliphatic alkylene group C_nH_{2n} , wherein n is an integer between 2 and 12;

Y is a straight chained or branched aliphatic alkylene group C_nH_{2n} , wherein n is 1, 2, or 5;

15

Z is a moiety derived from a compound selected from a group consisting of poly(ethylene glycol), poly(propylene glycol), random poly(ethylene glycol-co-propylene glycol), poly(ethylene glycol)-block-poly(propylene glycol), hyaluronic acid, poly(2-hydroxyethyl methacrylate), poly(3-hydroxypropylmethacrylamide), poly(styrene sulfonate), poly(vinyl pyrrolidone), and cellulose; and

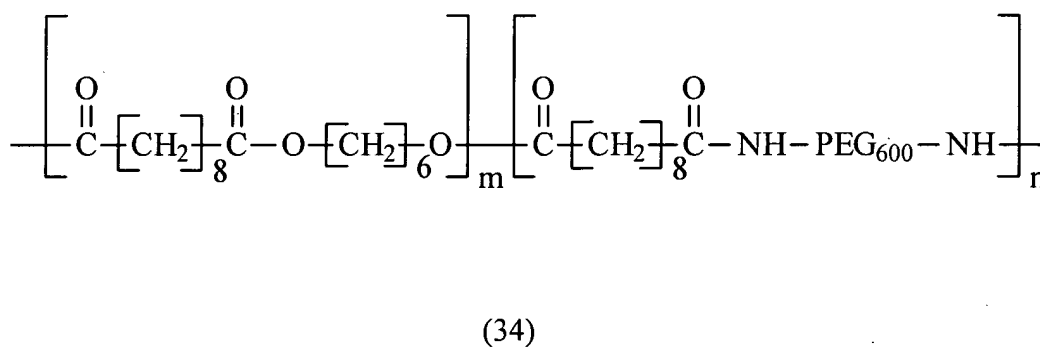
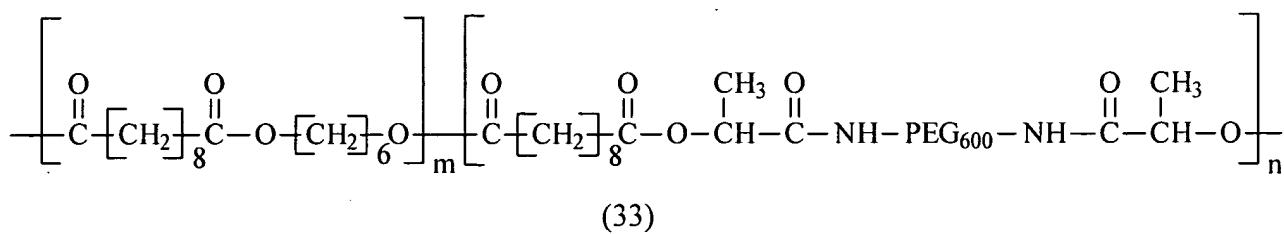
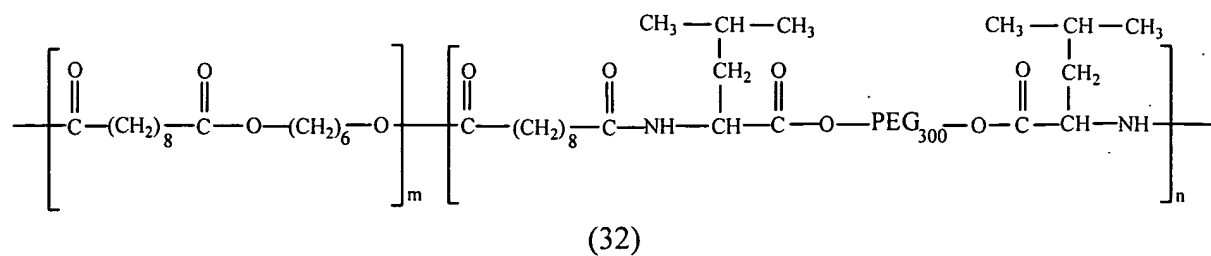
20

m , n , and p are integers where the value of m is between 5 and 1,800, the value of n is between 1 and 800 and the value of p is between 4 and 1,500.

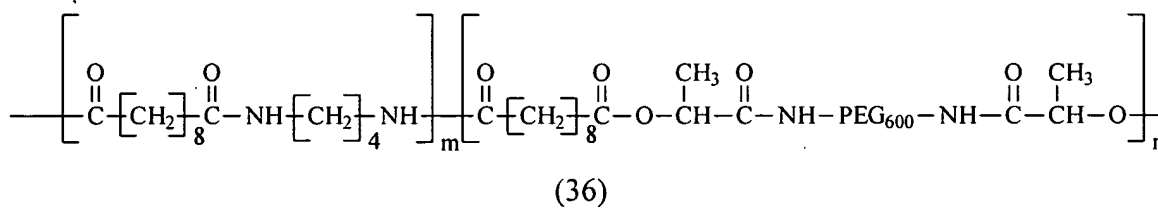
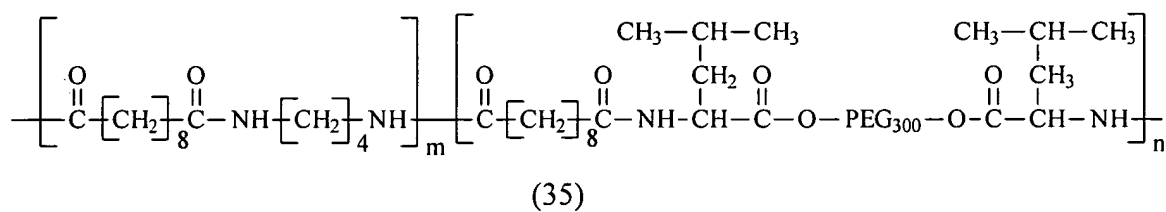
20. The medical article of Claim 19, wherein the polymer is selected from a group consisting of copolymers of formulae (23), (24), (25), (26), (27), (28), (29), (30), (31), (32), (33), (34), (35), (36), (37), (38), (39), (40), (41), (42), and (43):

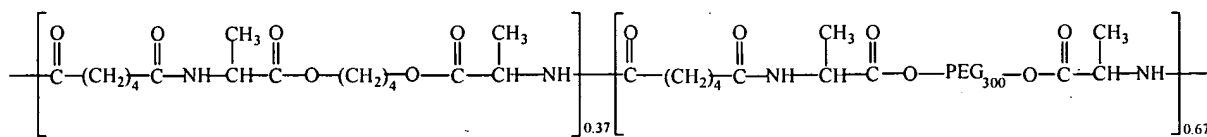
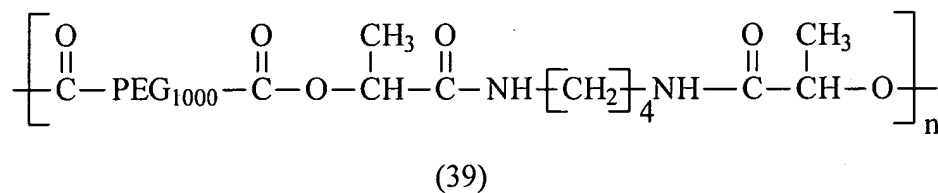
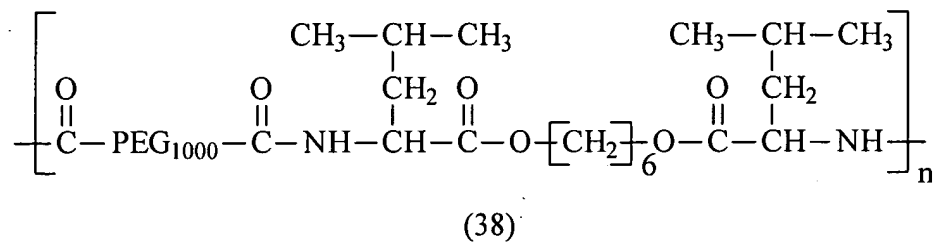
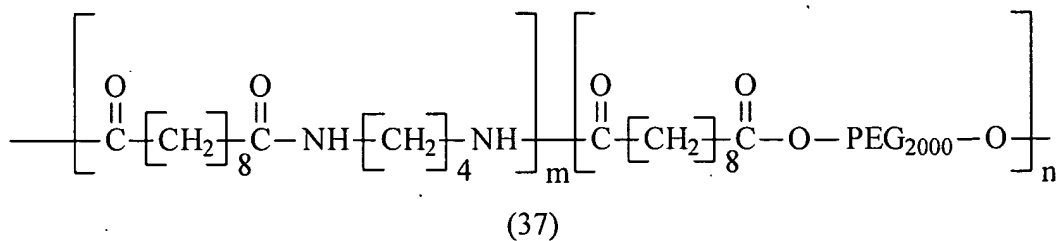




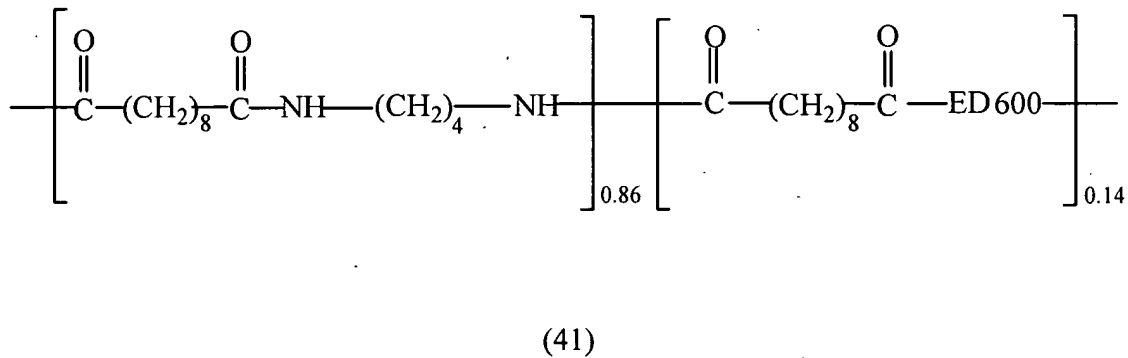


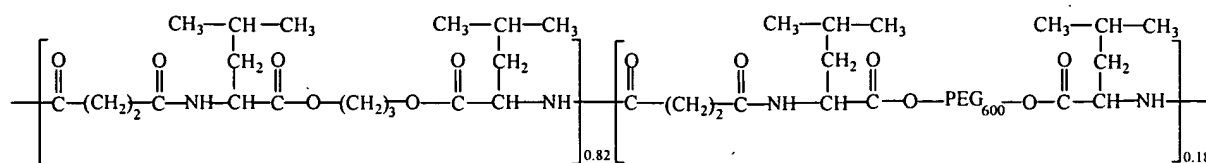
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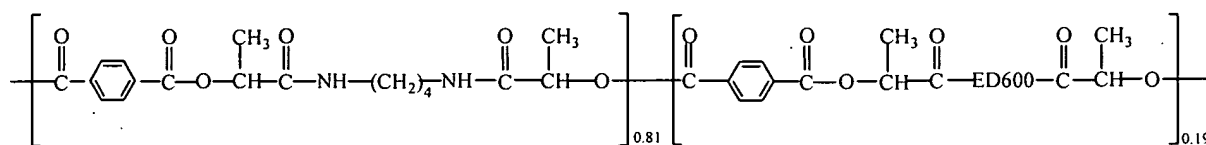


5 (40)





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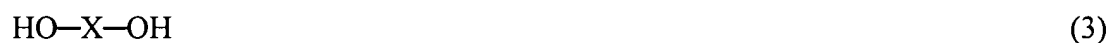
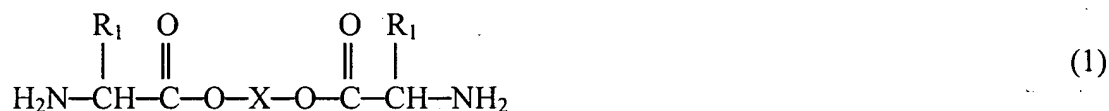


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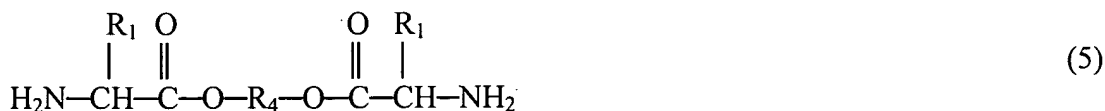
21. A method for fabricating a medical article, the method including synthesizing a copolymer and forming a coating based on the copolymer on at least a portion of an implantable substrate, the synthesizing of the copolymer including reacting a first reagent with a second reagent and with a third reagent, wherein:

(a) the first reagent is selected from a group consisting of compounds having formulae

(1), (2), (3), and (4):



(b) the second reagent is selected from a group consisting of compounds having formulae (5), (6), (7), and (8):



(c) the third reagent is a dicarboxylic acid having the formula (9):



wherein:

R_1 is hydrogen, methyl, *iso*-propyl, *sec*-butyl; *iso*-butyl, or benzyl group;

R_2 is methylene, methylenemethylene, *n*-propylene, *iso*-propylene, ethylenemethylene, *n*-butylene, *iso*-butylene, *sec*-butylene, or *n*-amylene group;

R_3 is a straight chained or branched aliphatic alkylene group C_nH_{2n} , wherein n is an integer between 2 and 12;

R_4 is a moiety derived from a compound selected from a group consisting of poly(ethylene glycol), poly(propylene glycol), random poly(ethylene glycol-co-propylene glycol), poly(ethylene glycol)-block-poly(propylene glycol), hyaluronic acid, poly(2-hydroxyethyl methacrylate), poly(3-hydroxypropylmethacrylamide), poly(styrene sulfonate), poly(vinyl pyrrolidone), and cellulose;

X is a straight chained or branched aliphatic alkylene group C_nH_{2n} , wherein n is an integer between 2 and 12;

Y is a straight chained or branched aliphatic alkylene group C_nH_{2n} , wherein n is 1, 2, or 5.

5 22. The method of Claim 21, wherein the implantable substrate is a stent.

 23. The method of Claim 21, wherein the molar ratio between the first reagent, the second reagent, and the third reagent is about 1:1:2.

 24. The method of Claim 21, wherein the compound of formula (1) is a diol-diamine, the diol-diamine is a product of condensation of an amino acid and a diol.

10 25. The method of Claim 24, wherein the amino acid has the formula (10):



 26. The method of Claim 24, wherein the amino acid is selected from a group consisting of glycine, alanine, valine, isoleucine, leucine, and phenyl alanine.

 27. The method of Claim 24, wherein a diol is selected from a group consisting of
15 ethylene glycol, 1,3-propanediol, 1,4-butane diol, 1,5-pentanediol, 1,6-hexanediol, 1,7-heptanediol, 1,8-octanediol, 1,9-nonanediol, 1,10-decanediol, 1,11-undecanediol, and 1,12-dodecanediol.

 28. The method of Claim 21, wherein the compound of formula (2) is an amidediol, the amidediol is a product of condensation of a hydroxy acid and a diamine.

20 29. The method article of Claim 28, wherein the hydroxy acid has the formula (11):



30. The method of Claim 28, wherein the hydroxy acid is selected from a group consisting of glycolic acid, lactic acid, β -hydroxybutyric acid, α -hydroxyvaleric acid, and ϵ -hydroxycaproic acid.

5 31. The method of Claim 28, wherein the diamine is selected from a group consisting of putrescine, 1,2-ethanediamine, and cadavarene.

32. The method of Claim 21, wherein the compound of formula (3) is selected from a group consisting of ethylene glycol, 1,3-propanediol, 1,4-butane diol, 1,5-pentanediol, 1,6-hexanediol, 1,7-heptanediol, 1,8-octanediol, 1,9-nonanediol, 1,10-decanediol, 1,11-
10 undecanediol, and 1,12-dodecanediol.

33. The method of Claim 21, wherein the compound of formula (4) is selected from a group consisting of putrescine, 1,2-ethanediamine, and cadavarene.

34. The method of Claim 21, wherein the compound of formula (5) is a PEG-diester-diamine conjugate, the conjugate is a product of condensation of an amino acid and
15 poly(ethylene glycol).

35. The method of Claim 34, wherein the amino acid has the formula (10):



36. The method of Claim 34, wherein the amino acid is selected from a group consisting of glycine, alanine, valine, isoleucine, leucine, phenyl alanine, tyrosine, serine, and
20 glutamic acid.

37. The method of Claim 21, wherein the compound of formula (6) is a PEG-amidediol conjugate, the conjugate is a product of condensation of a hydroxy acid and PEG-diamine.

38. The method of Claim 37, wherein the hydroxy acid has the formula (11):



39. The method of Claim 37, wherein the hydroxy acid is selected from a group consisting of glycolic acid, lactic acid, β -hydroxybutyric acid, α -hydroxyvaleric acid, and ϵ -hydroxycaproic acid.

40. A method for fabricating a medical article, the method including synthesizing a copolymer and forming a coating based on the copolymer on at least a portion of an implantable substrate, wherein the copolymer has a general formula (12) or (13):

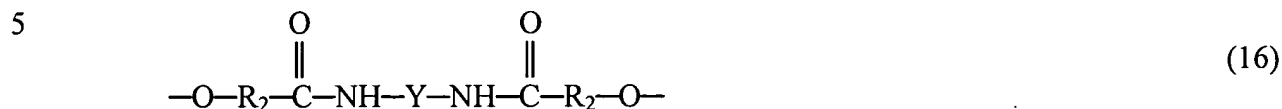
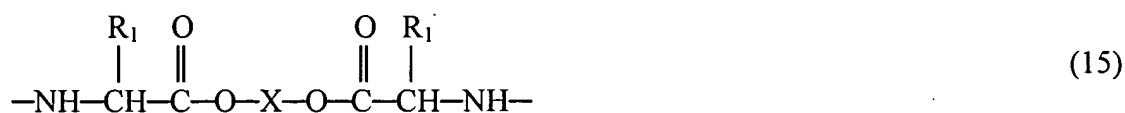


wherein:

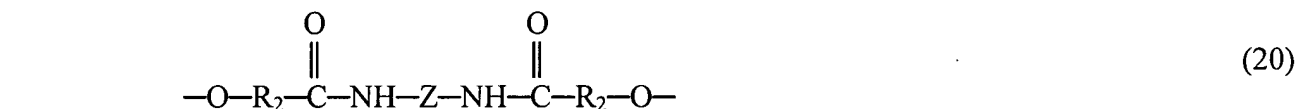
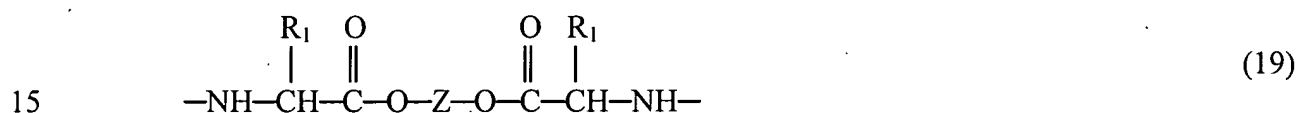
15 M is a moiety represented by the structure having the formula (14)



P is a moiety selected from a group consisting of structures having the formulae (15),
20 (16), (17), and (18):



Q is a moiety selected from a group consisting of structures having the formulae (19), (20), and (21)



M₁ is a moiety represented by the structure having the formula (22):



R₁ is hydrogen, methyl, *iso*-propyl, *sec*-butyl, *iso*-butyl, or benzyl group;

R₂ is methylene, methylenemethylene, *n*-propylene, *iso*-propylene, ethylenemethylene, *n*-butylene, *iso*-butylene, *sec*-butylene, or *n*-amylene group;

R₃ is a straight chained or branched aliphatic alkylene group C_nH_{2n}, wherein n is an integer between 2 and 12;

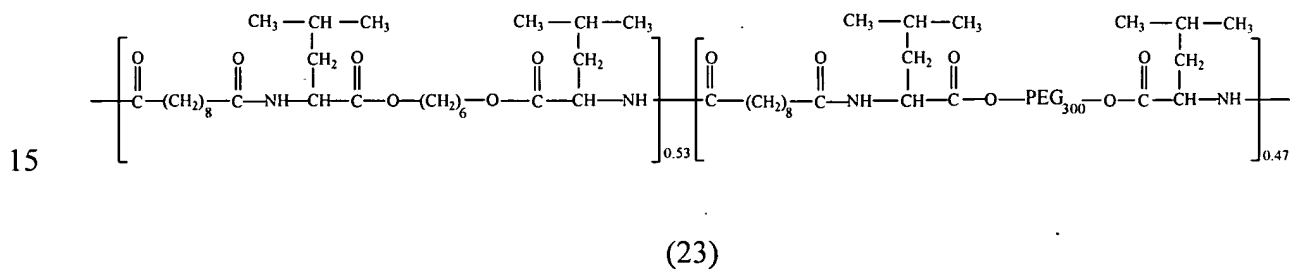
X is a straight chained or branched aliphatic alkylene group C_nH_{2n} , wherein n is an integer between 2 and 12;

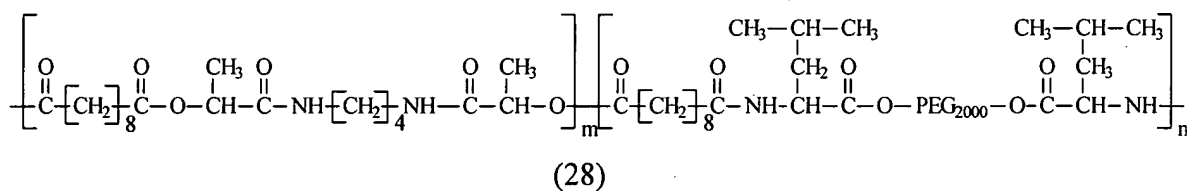
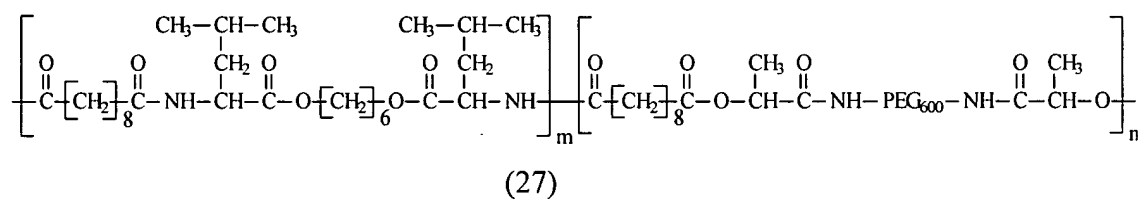
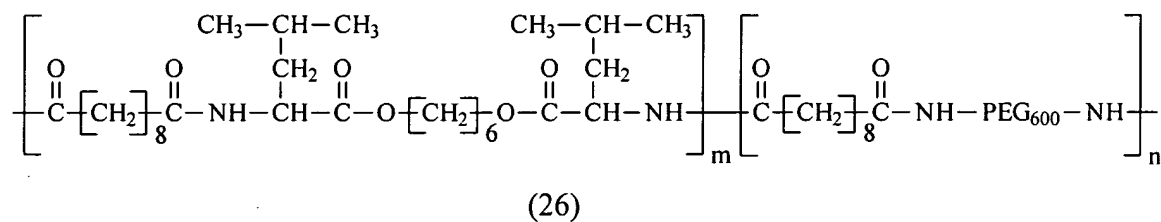
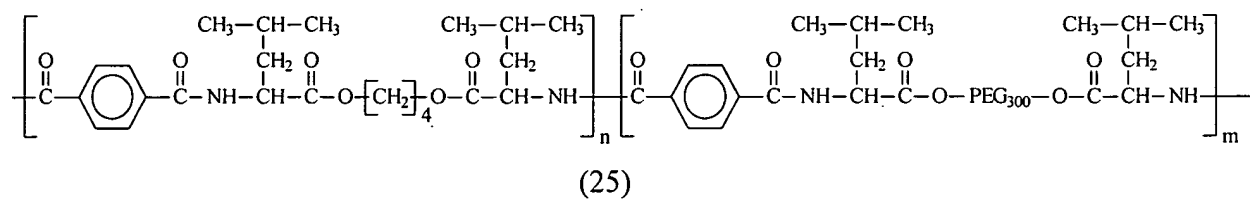
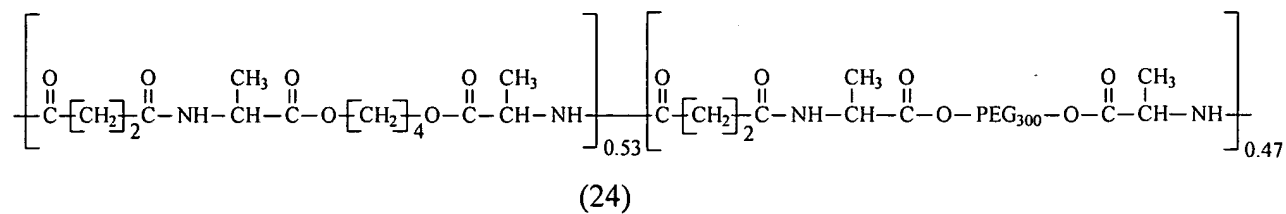
Y is a straight chained or branched aliphatic alkylene group C_nH_{2n} , wherein n is 1, 2, or 5; and

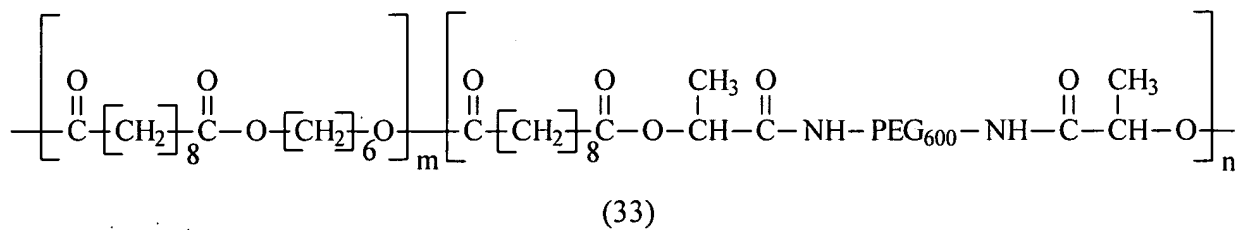
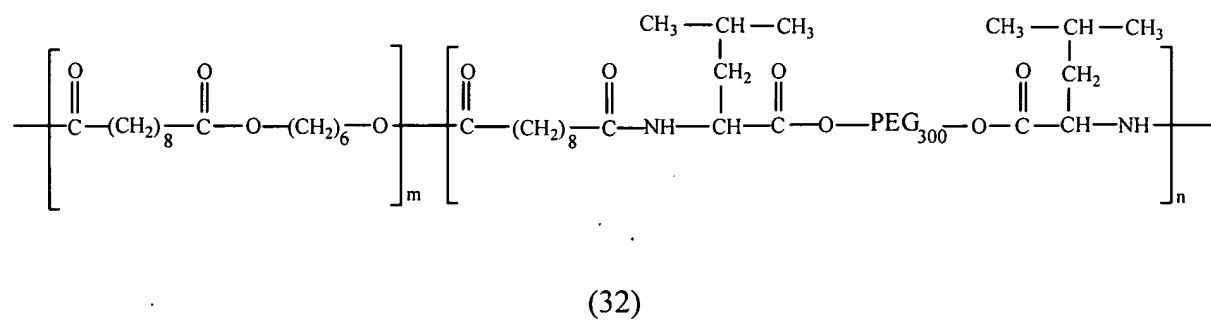
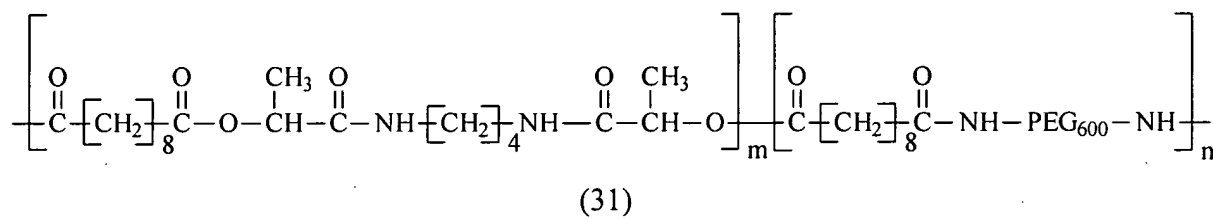
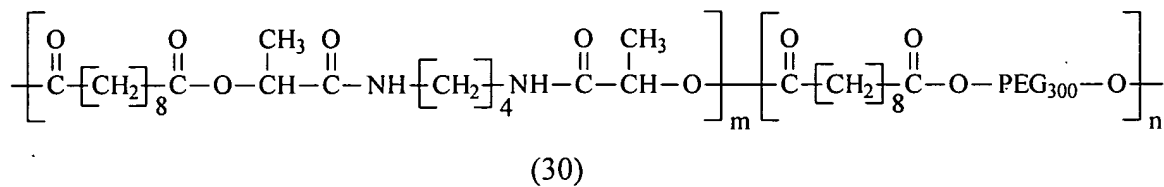
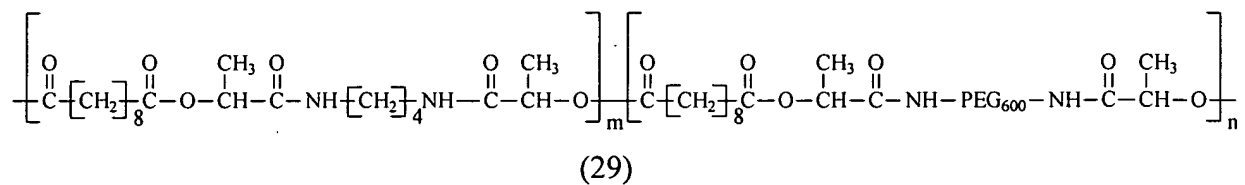
5 Z is a moiety derived from a compound selected from a group consisting of poly(ethylene glycol), poly(propylene glycol), random poly(ethylene glycol-co-propylene glycol), poly(ethylene glycol)-block-poly(propylene glycol), hyaluronic acid, poly(2-hydroxyethyl methacrylate), poly(3-hydroxypropylmethacrylamide), poly(styrene sulfonate), poly(vinyl pyrrolidone, and cellulose; and

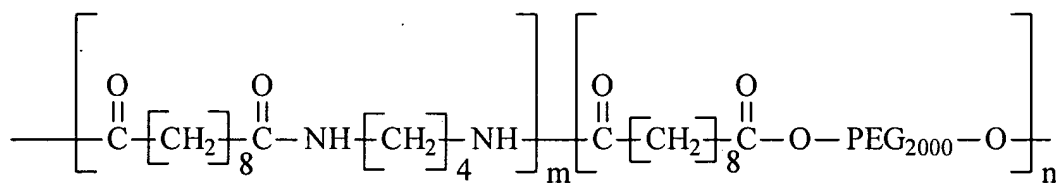
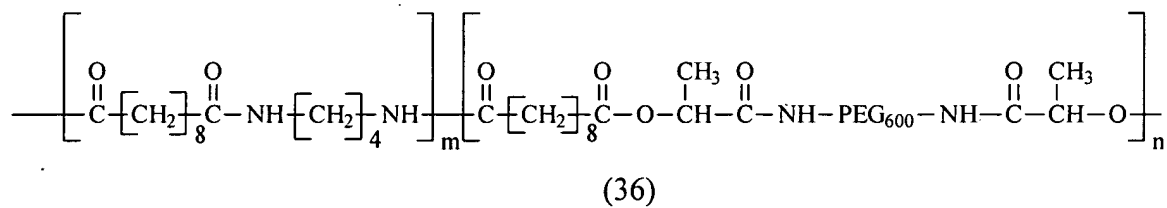
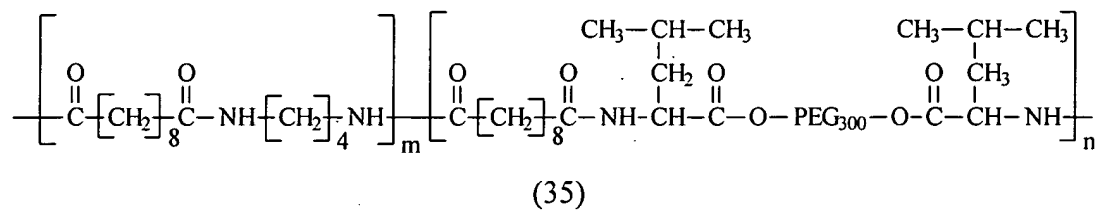
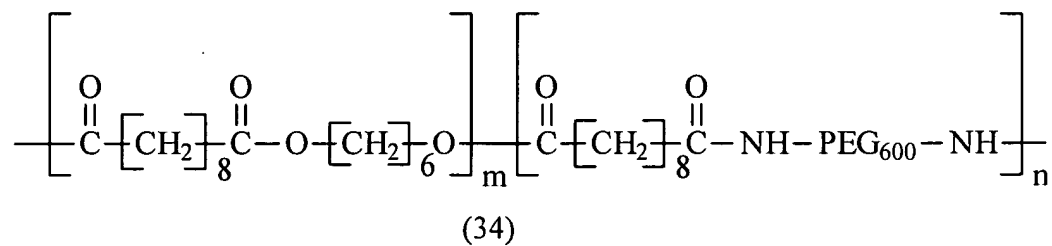
10 m, n, and p are integers where the value of m is between 5 and 1,800, the value of n is between 1 and 800 and the value of p is between 4 and 1,500.

41. The method of Claim 40, wherein the copolymer is selected from a group consisting of copolymers of formulae (23), (24), (25), (26), (27), (28), (29), (30), (31), (32), (33), (34), (35), (36), (37), (38), (39), (40), (41), (42), and (43):

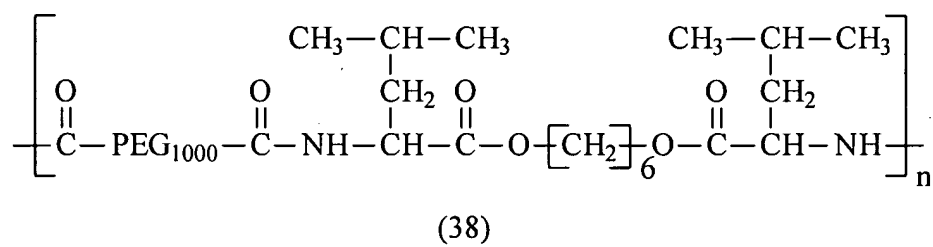


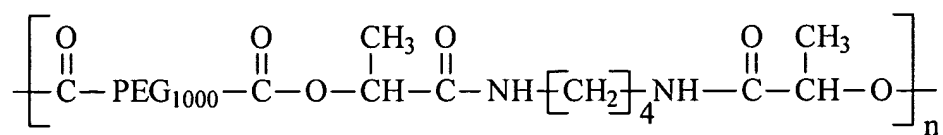




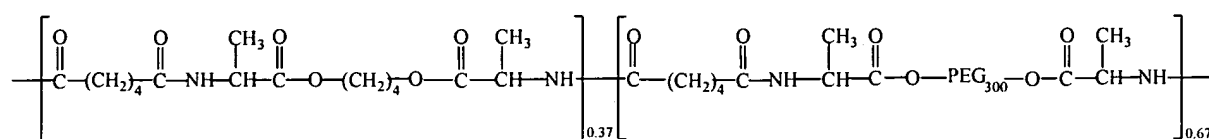


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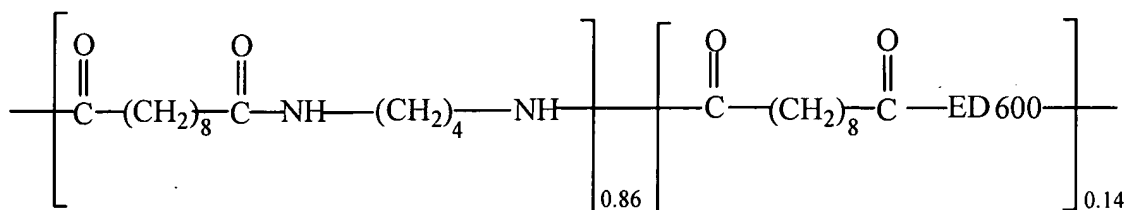




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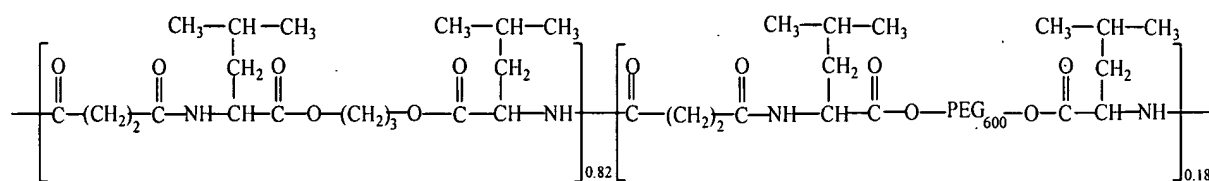


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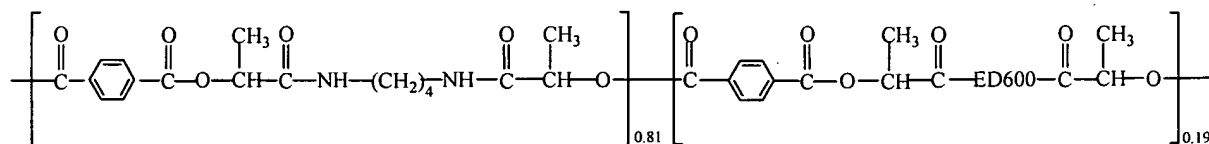


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